

BetterLesson Professional Learning Webinar

Introduction to the 5 Practices for Orchestrating Productive Mathematics Discussions



Anticipating & Monitoring Ohio Department of Education & Workforce January 31, 2024 Padriac O'Donnell / Megan Nagel

Welcome!



Welcome!

Share in the chat:

- Where are you joining us from today?
- What is your current role?
- What is your favorite math strategy to use with your students?



Aligned & Tailored for Ohio ESC Partnership



Aligned

Our partnership is specifically designed to amplify the impact of other state-wide infrastructure and initiatives.

Our coaches will be familiar with key efforts, including:

• Materials Matter

BetterLesson

- HQIM-related work streams with EdReports & Instruction Partners
- Ohio Standards for Math Practice



Tailored

Our team has worked with leadership from the ESC of Central Ohio, OESCA, and the Department of Education to tailor our workshop, coaching, and learning walk content to the unique needs of ESC Math Specialists



Department of Education & Workforce $\langle \cdot \rangle$

Our Webinar Series: The 5 Practices for Orchestrating Productive Mathematics Discussions



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Your Hosts



Padraic O'Donnell Instructional Coach



Megan Nagel Instructional Coach



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Instructional Coach (Tech Support)





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Our Series: The 5 Practices for Orchestrating Productive Mathematics Discussions



Goal

Explore tools and strategies to anticipate and respond to student thinking in real-time.

DEFINE	EXPLORE	BUILD	TRY, MEASURE, LEARN	
Uncovering and responding to student thinking	Conditions for monitoring student work	Understanding with resources for Practices 1 and 2		+
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Let's Check In!

We can't read our students' minds while they work!

Share one way you like to make students' thinking more visible while they are solving problems.



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Anticipating and Responding to Student Thinking



Professional Learning Reimagined

5 Practices for Orchestrating Productive Mathematics Discussions







Proactive Planning

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"The five practices were designed to help teachers use students' responses to advance the mathematical understanding of the class as a whole by providing teachers with some control over what is likely to happen in the discussion as well as more time to make instructional decisions by shifting some of the decision making to the planning phase of the lesson."



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5 Practices for Orchestrating Productive Mathematics Discussions, Smith & Stein



Anticipating Student Responses

What: Predict and plan for a variety of student responses to a task.

When: Before the lesson

How:

- Do the problem yourself
- What are students likely to produce?
- Where are they likely to get stuck?
- ❑ What can we do about it?





- Do the problem yourself
- What are students likely to produce?
- Where are they likely to get stuck?
- What can we do about it?

Let's Give it a Try!



How long would it take to count to a million?



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Task is:

- Low floor
- High ceiling
- Wide walls



What exactly are we anticipating?



Student Approaches

- Ways of solving
- Errors
- Misconceptions

Collaborate with others!

Responding to Students

- Assessing and advancing questions
- Addressing roadblocks

Connecting to Goals

- Strategies for whole class discussions
- Critical strategiesprepare to include no matter what

Add on to any anticipated ideas in the chat!





Assessing and Advancing Questions

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While students are working we can ask two types of questions:

Uncover student thinking

Assessing

- Learn about student understanding
- Based on student work
- Teacher listens to answer

Move towards learning goal

Advancing

- Push students to think about something more
- Teacher walks away, leaves student to thinkand comes back!

Assessing and Advancing Questions



While students are working we can ask two types of questions:



Assessing

- Can you tell me what you did?
- How did you get 2.5? What does it tell you?
- Why did you multiply by 12? What does it represent?
- How did you know when to stop subtracting?



Advancing

- How are these numbers related?
- What would happen if you had 100 instead of 12?
- What if we want everyone to get the same amount?
- Can you draw a picture that would help explain this?



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Addressing Roadblocks



Appropriately scaffolding without reducing cognitive demand:

- Inviting students to the math
- Chunking tasks
- Creating structured opportunities for processing
- Using touchstone visual representations
- Providing graphic organizers





Why Anticipating?



How does anticipating student responses make these teaching practices possible?



5 of the 8 Effective Teaching Practices (NCTM)



Conditions for Anticipating

What needs to be in place for this practice to occur?

- Explicit goals and high-level tasks
- Content and pedagogical knowledge
- Time
- Opportunities for collaboration
- Support for responses to roadblocks and purposeful questioning





Monitoring for Brilliance



Professional Learning Reimagined



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Monitoring for Brilliance



What: Listen to and observe what students are saying and writing, and keep track of approaches

When: While students work on a problem

How:

- Circulate, watch, listen
- □ Find the key strategies
- Purposefully respond with questions and feedback
- □ Keep track!



Feedback While Students Work





What type of feedback can a teacher give while students work? Verbally and nonverbally

What messages do we want to send

to students while they work?





Learning Through Problem-Solving

"Teachers must also decide what aspects of a task to highlight, how to organize and orchestrate the work of the students, what questions to ask to challenge those with varied levels of expertise, and how to support students without taking over the process of thinking for them and thus eliminating the challenge."



Principles and Standards for School Mathematics

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Conditions for Monitoring



What needs to be in place for this practice to occur?

- Monitoring charts
- Work time norms
- Timers
- Visible thinking- individually and collaboratively





Supporting Thinking During the Task

We are supporting two types of thinking:

Reasoning: Defining the path from the problem to the solution.

Problem-Solving: Applying skills and knowledge to arrive at the solution.

Understanding what students are thinking helps us to select the appropriate level of support.









What do we do while students work?



Spy: Listen and watch. Avoid jumping in and repeating yourself.

Collaborative Structures: Create opportunities for students to discuss their thinking with their peers

Question: Use purposeful questions to understand and advance student thinking

Mindset: Encourage risk-taking and normalize frustrations in support of a growth mindset





What are students doing?



Starting: Selecting an entry point to try, even if they're not 100% sure about how to get to the solution

Discussing: Listening, explaining, reflecting, and asking questions within partners or small groups

Representations: Working to make their thinking clear using representations- verbal, visual, contextual, symbolic, physical

Mindset: Managing social and emotional needs to persevere through challenges





Monitoring Charts Essential for Productive Discussions



"The monitoring chart is a tool for keeping track of who is doing what during the "explore" phase of the lesson. While some teachers have argued that they don't need to write anything down because they will remember it, our experience suggests that once you have visited more than two groups, it is nearly impossible to remember which students produced which responses, what you need to go back and check on, and the things with which students struggled."



Monitoring Charts

Keep track of which strategies show up and who's using them



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Reminders of questions you planned

arning Goal:	Anticipated Strategy	Questions:		Select?	Order
Strategy Who and What (Monitor & Select)		Assessing:	Advancing:		
Anticipate) (Monitor & Science)					
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oppecting questions (Consect):					
Other Connecting questions (Connect):					



Explore Monitoring Charts



Pick a monitoring chart to check out. Share:

- 1. What are the pros and cons of the chart?
- 2. How could you use this in your context?

<u>Chart 1</u>

<u>Chart 2</u>

Chart 3





Synthesize–Goals for Monitoring

- Pay attention to students' work:
 - Thinking (Reasoning)
 - Strategies (Problem-Solving)
- Circulate, watch, listen (spy)
- Question in order to:
 - Make thinking visible
 - Clarify thinking
 - Consider what's missing
- Encourage student revision
- Look for key approaches to highlight



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Why Monitoring?



How does monitoring student thinking make these teaching practices possible?



5 of the 8 Effective Teaching Practices (NCTM)



Letting Students do the Thinking

The key benefit of using the five practices model is that it **helps the teacher maintain the cognitive demands of a high-level task** and in doing so gives students opportunities to experience mathematics as more than the application of procedures without connections to meaning or understanding.

In addition, by building discussions on your students' thinking, you are honoring it while guiding it in a productive disciplinary direction. Through this process, **students can come to see themselves as capable of doing well, with effort, in mathematics.**



5 Practices for Orchestrating Productive Mathematics Discussions, Smith & Stein

Build

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How can we make this work actionable?



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Let's Explore: Strategy Choice Board

Choose any of the sections below and explore the related BL resources & strategies.

Learn More About Monitoring Students

BetterLesson Strategy Creating Shared Work Time Norms and Expectations

BetterLesson Strategy Make Student Thinking Visible BetterLesson Strategy

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Q & A

What questions do you have about our conversation today?





We value your feedback!

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Your input is important to us, please take a moment to complete our survey using the link in the chat. Please include your name and email for credit.





Thank you!





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